Fig. 5b shows a high-pass birdcage filter that is tapered on both sides and forms a double-filter. In contrast to the diamond filter, the high-pass birdcage filter contains several conductor loops, for example, 51c and 51d, which form contact, via capacitances, with at least one additional conductor loop. The high-pass birdcage filter, however, can also form only one filter cage.

Fig. 5d shows a circuit diagram for a high-pass birdcage filter containing several conductor loops 51c guided in the longitudinal direction of the vessel filter, each of which is connected on its ends via a capacitance (for example, C16) to another conductor loop 51d. Several oscillating circuits are then formed according to the "high-pass birdcage principle."

Fig. 6a-6c show possibilities for coupling between a guide wire/catheter, on the one hand, and a vessel filter, on the other. A fixed coupling between a guide wire or catheter 62a and a vessel filter 63a is shown in Fig. 6a: the guide wire or catheter 62a is then guided out of the vessel filter 63a.

Figures 6b and 6c, on the other hand, show examples of releasable mechanical couplings: the conductor loop 61b of the filter in Fig. 6b is then guided loop-like from the resonance circuit. A hook-like guide wire or end region of a catheter 62b can enclose the loops. As shown in Fig. 6c, it is also possible to form the loops from the guide wire/catheter 62c and the hooks from the conductor loop 61c.

Claims

1. Vessel filter with at least one conductor loop that forms the inductance of an electrical resonance circuit, characterized by the fact that the conductor loops (11a, 11b; 21a-f; 41; 51a-d) form the vessel filter (10; 20; 40; 50) or parts (12a-e, 13a, 13b; 22a, 22b; 46; 53) of the vessel filter.

2. Vessel filter according to Claim 1, characterized by the fact that the vessel filter (10; 20; 40; 50) forms several resonance circuits, each with at least one conductor loop (51a-d).

3. Vessel filter according to Claim 2, characterized by the fact that several resonance circuits are coupled to each other.

4. Vessel filter according to at least one of the preceding claims, characterized by at least one integrated circuit coupled to the resonance circuit so that it [the resonance circuit] is adjustable or tunable by the integrated circuit.

5. Vessel filter according to at least one of the preceding claims, characterized by spacers and/or insulators that keep the individual sections of the conductor loops (14, 14a-d; 24; 301a-c; 44) at a spacing from each other and/or insulate them from each other.

6. Vessel filter according to at least one of the preceding claims, characterized by the fact that the insulators simultaneously form an internal capacitance in connection with at least one conductor loop (11a, 11b; 21a-f; 41, 51a, 51b).

7. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop (11a, 11b; 21a-f; 41; 51a-d) is enclosed by a nonconductor, especially plastic and/or ceramic.

8. Vessel filter according to Claim 7, characterized by the fact that a parasitic capacitance is adjusted via the enclosure.

9. Vessel filter according to at least one of the preceding claims, characterized by the fact that the resonance circuit has a resonance frequency, especially in the high-frequency range, that corresponds to the frequency of an external magnetic field, especially of an MR tomograph.

10. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop (11a, 11b; 21a-f; 41; 51a-d) has at least one electrically nonconducting material, on whose surface at least one conductor material, especially gold, platinum, tantalum and/or conducting alloys, is applied.

11. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop (11a, 11b; 21a-f; 41; 51a-d) is deployable.

12. Vessel filter according to at least one of the preceding claims, characterized by the fact that the resonance circuit is formed during and/or after implantation in a body.

13. Vessel filter according to at least one of the preceding claims, characterized by the fact that the vessel filter (10; 20; 40; 50) has several conductor loops (21a, 21d; 51a, 51b).

14. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop (11a, 11b; 21a-f; 41; 51a-d) has several conductor loop windings (14, 14a-d) that are guided so that the conductor loop (11a, 11b; 21a-f; 41; 51a-d) forms an elongated base (12a-e) that is sealed on at least one side with a screen-like filter cage (13a-d).

15. Vessel filter according to at least one of Claims 1 to 13, characterized by the fact that the vessel filter (20; 40; 50) has several conductor loop windings (24 a-c; 301a-e, 304, 304b; 44) guided so that the largest spacing of the loop windings from each other occurs in the longitudinal center and tapers on at least one long side.

16. Vessel filter according to Claim 15, characterized by the fact that the conductor loops (21a, 21d-f) taper to two sides.

17. Vessel filter according to at least one of Claims 1 to 13, characterized by the fact that the vessel filter (40) has several conductor loop windings (44) that merge on one side of the filter in a filter cage (53) and extend leg-like on the other side of the filter.

18. Vessel filter according to at least one of the preceding claims, characterized by the fact that the vessel filter (40) has at least one conductor loop winding (44) that forms at least one extension (46) that serves for connection of the filter to a vessel wall.

19. Vessel filter according to Claim 18, characterized by the fact that adjacent regions of the conductor loop winding (44) are guided at limited spacing from each other in extension (46).

20. Vessel filter according to Claims 18 and 19, characterized by the fact that adjacent regions of conductor loop winding (44) are connected to each other without intermediate space in extension (46), especially made from one piece, welded, soldered or pressed.

21. Vessel filter according to Claims 18 to 20, characterized by the fact that the extension (46) points in the direction of blood flow of a vessel in which the filter is arranged.

22. Vessel filter according to Claims 18 to 21, characterized by the fact that the extension (46) points in the direction of the vessel wall.

23. Vessel filter according to at least one of Claims 1 to 12, characterized by the fact that the vessel filter (50) contains at least two foldable, especially zigzag-like conductor loops (51a, 51b), in which one conductor loop (51a) forms a capacitance (C8, C15) at at least one reversal point (59) with at least one additional conductor loop (51b) or permits connection of an external capacitance, and the reversal point (59) of at least one of the conductor loops (51b) has a smaller spacing on one side than on the other side and especially forms a filter cage (53).

24. Vessel filter according to at least one of Claims 1 to 15, characterized by the fact that the vessel filter (10; 20; 40; 50) contains at least two conductor loops (51c, 51d) guided in the longitudinal direction of the vessel filter that are connected on at least one end to another conductor loop via capacitance (C16).

25. Vessel filter according to at least one of the preceding claims, characterized by the fact that the vessel filter (10; 20; 40; 50) forms a double-filter in which the corresponding ends of the conductor loops each form a filter cage (13a, 13b; 22a, 22b).

26. Vessel filter according to at least one of the preceding claims, characterized by the fact that the individual windings of the conductor loops (21a, 21b, 21d-f; 41; 51a, 51b) extend in the longitudinal direction of the vessel filter.

27. Vessel filter according to at least one of the preceding claims, characterized by the fact that the vessel filter (10; 20; 40; 50) has at least one brace (47) connected to the conductor loop (11a, 11b; 21a, 21b, 21d-f; 41; 51a-d).

28. Vessel filter according to Claim 27, characterized by the fact that the braces (47) are conducting and are connected conducting to the conductor loop (11a, 11b; 21a, 21b, 21d-f; 41; 51a-d).

29. Vessel filter according to at least one of the preceding claims, characterized by the fact that individual braces (47) are moveably connected to individual conductor loop windings (44).

30. Vessel filter according to Claims 18 to 22, characterized by the fact that the extension (46) is moveably arranged relative to the braces (47).

31. Vessel filter according to Claims 27 to 29, characterized by the fact that the vessel filter (10; 20; 40; 50) contains braces (47) made of bioresorbable material.

32. Vessel filter according to at least one of the preceding claims, characterized by the fact that at least one semiconductor element, especially a diode (D1 to D4, D3', D4') and/or a transistor and/or an integrated circuit is formed on vessel filter (10; 20; 40; 50).

33. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop (11a, 11b; 21a, 21b, 21d-f; 41; 51a-d) is formed from a material piece, especially a tube, wire or electrically-conducting plastic.

34. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop (11a, 11b; 21a, 21b, 21d-f; 41; 51a-d) is produced by repeated lengthwise cutting of a tube (309) and subsequent expansion.

35. Vessel filter according to Claim 33 and/or 34, characterized by the fact that the conductor loop (11a, 11b; 21a, 21b, 21d-f; 41; 51-d) is guided meander-like on the sides.

36. Vessel filter according to at least one of the preceding claims, characterized by the fact that the conductor loop windings (14, 14a-d; 24; 301a-c; 44) are joined on the ends by welding, gluing, clamping, sealing and/or shape-mating, especially by thermally initiated shrinkage of a cylinder made of a shape memory material.

37. Vessel filter according to at least one of the preceding claims, characterized by the fact that at least one conductor loop winding (14, 14a-d; 24; 301a-c; 44, 51) is provided with at least one hook, for example, an anchoring hook, for fastening in a vessel wall.

38. Vessel filter according to at least one of the preceding claims, characterized by the fact that the vessel filter (10; 20; 40; 50) has at least one connection device (28, 28a; 48a, 48b) for coupling to a device for introduction and/or extraction of the filter.

39. Vessel filter according to at least one of the preceding claims, characterized by the fact that the vessel filter (10; 20; 40; 50) contains at least one means (28a) for braking of the filter during introduction into the body.

40. Vessel filter according to Claims 38 and 39, characterized by the fact that the connection device (28, 28a; 48a, 48b) simultaneously represents the braking device (28a).